

1998-4815

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DEPARTMENT OF TRANSPORTATION

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DOCKET SECTION

Dear Sir, please find attached the UK CAA comments on Docket No. FAA-1998-4815, Airworthiness Standards; Bird Ingestion. Please be advised that these comments will also be sent by airmail.

Thankyou for the opportunity to take part in your rulemaking process.

Best Regards

Michael Poole  
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OFFICE OF THE  
CHIEF COUNSEL  
RULES DOCKET  
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Our Ref: 9/61/10CD

4<sup>th</sup> March 1999

Federal Aviation Administration (FAA)  
Engine and Propeller Directorate  
ANM-110  
Attn: Rules Docket No. 1998-48 15  
FAA New England Region  
12 New England Executive Park  
Burlington  
Massachusetts 01803-5299

Dear Sir,

**ATTENTION RULES DOCKET NO: 1998-4815**  
**AIRWORTHINESS STANDARDS; BIRD INGESTION**

Please accept the UK CAA comments given below on the Notice of Proposed Rulemaking.

1. **General**

The 'Background' section of the NPRM is presented in a manner which is difficult to follow and understand. In particular the section describing the ARAC Project is confusing and **unfocussed**. This lack of clarity is particularly evident from the point of view of a statement of the overall safety objectives.

2. **Safety Objectives**

The text states that "The basis for the development of this proposed rule is to.. . . . substantiate that the engine design provides at least a **1E-8** per aircraft cycle freedom from risk of a hazardous consequence to the aircraft due to the bird ingestion threat".

Subsequently we are told that the ingestion criterion for medium and large engines is freedom from multi engine power loss events at a rate of **1E-8** per aircraft cycle.

A further paragraph states that the proposed standards are intended to reduce the risk of a dual engine power loss from current in-service rates. “The improvement goal is approximately **1E-8** or better per aircraft departure.”

Objective Based Regulation will be assisted if the objective is more carefully defined with the term ‘power loss’ better quantified in terms of the safety effect.

### 3. **Data Bases**

The criteria for inclusion of ingestion events on to the data base need to be explained, and whether account has been taken of near misses, including multiple **airframe** strikes. Further, it is unclear if training and cargo flights have been included.

### 4. **Statistics**

The statistical evaluation of the data appears to be of a simple nature. No assessment of confidence appears to have been made. Such an assessment could have had a significant effect upon the future probability of occurrence of relatively infrequent events. No account seems to have been taken of the perceived increase in large flocking bird population growth rate. The approach has been preoccupied with past engine experience rather than attempting a proactive assessment of the future threat.

### 5. **Large Flocking Birds**

The preamble, whilst **recognising** the existence of flocking birds larger than **2.5lb**, fails to address the threat in a satisfactory manner. Substantial evidence exists to support the view that the Canada Goose population, both migratory and resident, is increasing at a considerable rate. The probability of a large twin transport aircraft ingesting such a bird into each engine will be increasing in a similar manner. Such an encounter **would** carry an even higher risk if the robustness of the engines was sufficient only to comply with the proposed new rule.

The CAA does not believe that airport control measures, in a global context, can be considered to alleviate the problem with any degree of confidence. Furthermore, we are not convinced that available engine technology is incapable of mitigating the risk.

The NPRM in this respect does not provide ‘a reduction in risk of a dual engine power loss due to flocking bird ingestion of any size’, compared with the previous rate. The risk associated with large flocking birds (>2½lbs) needs to be reconsidered.

### 6. **Dissenting Position of JAA**

1. The FAA are incorrect in stating that the JAA position is expressed as a minority position in the NPA for this subject. The JAA position, as one would expect, is quoted directly in the requirement proposed by the NPA (NPA-E-20). It is improper, in this respect, to refer to the JAA as a minority.

2. The FAA are incorrect to interpret the **JAA's** position as requiring engine designs to be assessed against a threat **from** flocking birds larger than **4lbs**. The **JAA's** intent is to ensure that the current demonstrated capability of engines to withstand a strike from a 41b. bird without significant loss of material is maintained.
3. In their response to the JAA position, the FAA do not appear to have recognised the significance of the fact that the current service experience has been accumulated on engines which have demonstrated compliance with the 41b. (large) bird requirement without significant loss of material. (Refer to the fourth paragraph of the JAA rationale quoted in the NPRM).

The FAA state that “(they) do not believe it is necessary to consider the margin above the certification standard with which any particular engine model demonstrates compliance, and that discussion of economic pressure has no place in objective evaluations of safety.”

It should be recognised that it is this very margin which the **JAA** is seeking to protect since the past service experience has been accumulated on engines, a significant number of which demonstrated such a margin during certification.

Furthermore, whether by virtue of economic pressure or as a result of the introduction of new technology or related changes in material behaviour, there is already evidence, which has been presented to both FAA and JAA, which shows that an engine can be designed to meet the **6-81b**. bird strike requirement pass/fail criteria, yet potentially have little or no capability to survive a strike from a 41b. bird with the same degree of success as previously certificated designs. Without such capability, it is difficult to see how the new requirement as proposed by the FAA's NPRM, can be confidently expected to produce the benefits sought.

The FAA also make the point that “with identical test criteria, an engine passing the proposed test will be at least as capable of a large bird safe shutdown as a current engine”. Again, this demonstrates that the FAA have failed to grasp the fact that whilst the test criteria are indeed the same, the majority of current engines have passed the test without significant loss of blade material. Thus the demonstrated pass criteria are already better than the existing requirement. This must be maintained for the 41b. bird case if the overall capability of engine designs against the recognised bird threat is to be enhanced.

4. It is recognised that extensive data have been collated and used in the development of this proposal. This same data has also been considered by JAA in developing the corresponding NPA on this subject. However, as with any such collection of data, it should also be recognised that there will inevitably be some degree of error. Already there is evidence to suggest that the data does not reflect accurately the service experience and that the criteria used to **categorise** the data may be flawed.

Furthermore, it is already accepted that the world's bird population is changing significantly and that the size of flocking birds is increasing. Thus, whilst the proposed rule sets out to enhance engine capability against the threat as perceived at present, it will be undermined if the emerging threat of the larger flocking bird is not addressed at least in part, by maintaining the ability of engines to meet the 41b threat in the same manner as the majority of designs have demonstrated in the past.

In summary therefore, the NPRM is broadly supported in so far as it corresponds to the equivalent JAA NPA-E-20. However, it is considered that FAA have failed to **recognise** the importance of the **JAA's** position regarding the 41b. bird issue and that the basis for FAA's disagreement with JAA on this point is fundamentally flawed.

The issue of the threat posed by large flocking birds needs to be **re-examined** in terms of the validity of the data base, its statistical analysis, and a more proactive approach to the future risk of ingesting flocking birds of greater than **2½lbs.**

Thank you for the opportunity to take part in your rulemaking process.

Yours faithfully,

M Poole  
Requirements and Policy Unit